Richmond Refinery LPS Bulletin – Reliability & Safety

Unloader Failure and H2S Exposure at K-1100A Compressor

IMPACT ERM: 21929

Location:
Distillation & Reforming,
Richmond Refinery

Contact Information:
Art Mares
510-242-3461
adma@chevron.com

Suction valve unloader

Parts inside restricting the flow.

IIF - Every Task, The Right Way, Every Time

Incident Description:

On September 15th, 2011 at 04:38, one of the second stage crank end valve unloaders on a Crude Unit Atmospheric Column Off-Gas Compressors (K-1100A) became detached from the compressor. This caused a leak of hydrogen sulfide (H2S) and mixed light hydrocarbons may have been released into the atmosphere.

The Chevron Fire Department was notified and the area and roads around the compressor were taped off. Non-operations personnel were evacuated to a safe distance per the D&R Emergency Action Plan. There were no injuries or off-site impact as a result of this incident.

Investigation Findings:

1) The shop procedure and guidance from the refinery Rotating Equipment Reliability team has a torque value for the cover and not the jam nut. Machinists apply torque to the jam nut based on feel because they do not want to over torque the equipment since it is cast material.
2) The design of the unloaders on K-1100A allows an operator to turn the valve unloader past the position where the plate valve is closed because there is no visible indicator to advise the operator when they have reached the desired position and to stop turning the valve.

Lessons Learned / Business Practices:

1) The design of the valve unloaders on K-1100A was such that there was no field indication that the unloader had reached the position where the plate valve was no longer held open. The post-incident inspection found that the valve unloader was turned past the fully closed position and that it would only take 9 ft-lbs of torque to exceed the desired position and loosen the jam nut.

Recommendations:

1) Upgrade the hand operated valve unloaders on the K-1100A to eliminate the jam nut torquing issue by identifying the closed position.
2) Revise the procedures for compressor loading and unloading to reflect the upgraded design. The procedure should clearly define which valves are crank end and which are head end.

Tenets of Operations Violated:

1) Always operate in a safe and controlled condition.